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## **A MESSAGE FROM THE CRITICAL CARE SPECIALIST - ETHYLENE GLYCOL -**

A hint of chill is in the air, reminding car drivers and pet owners that antifreeze season is drawing near. As the recent poisoning incident in High Park has shown us, antifreeze toxicity can happen at any time of the year. Ethylene glycol is the toxic ingredient in antifreeze. Animals are drawn to its sweet taste. Unfortunately, ingestion of only very small amounts are required to cause life-threatening problems. Initial signs of toxicity occur shortly after exposure and may be vomiting, inappetance, depression, increased water consumption and increased urine production. Some animals develop a characteristic wobbly gait that makes them appear drunk. Because these signs may not be severe, many owners do not seek immediate veterinary attention. This is unfortunate, because rapid intervention with medical care is key to successful therapy. Delay in treatment usually causes progression to kidney failure.



Ethylene glycol is quickly metabolized into more toxic products. The metabolites cause a severe metabolic acidosis and within 24-48 hours, renal failure. The renal failure does not improve with standard care, and death or euthanasia is inevitable without access to kidney transplantation.



Early intervention with products that slow down or stop the metabolism of the ethylene glycol are successful in treating the toxicity associated with this product. Intravenous ethanol is an older but effective antidote. A newer antidote, fomepizole, is available. Fomepizole works well, and avoids the side effects of severe depression and marked increased urine output associated with ethanol. It is an expensive medication, but the expense may be recompensed by allowing fewer days in hospital. Either medication must be administered within hours of ingestion of the ethylene glycol to be most effective.

Aside from avoidance of toxin ingestion, quick recognition of ethylene glycol toxicity on part of the owners and veterinarians is most important to avoid a tragic outcome. Veterinarians may recognize the signs of vomiting, ataxic gait, inappetance and increased water consumption and urine production. Blood tests done on admission to the clinic may show high blood sugar or low blood calcium. Unfortunately, a routine biochemistry panel is usually not diagnostic. Urine sediment may have characteristic calcium oxalate crystals, and may fluoresce under a UV lamp due to the additives in the antifreeze. Signs of kidney failure do not show up until a day or two later. All ill animals that come to the VEC referral hospital undergo quick assessment bloodgas and electrolyte analysis within minutes of admission that shows the telltale metabolic acidosis with a high anion gap, high blood sugar and low blood calcium that are characteristic early in the course of this toxicity. This rapid blood assessment was key to the quick recognition and successful treatment of the recent High Park cases.

Rapid referral to a facility with blood-gas analysis, fomepizole and a critical care service will ensure the rapid diagnosis and initiation of therapy needed to save these cases. Veterinarians with a strong suspicion of antifreeze toxicity whose clients are hours away from a referral hospital would be wise to initiate therapy with a dose of intravenous ethanol prior to sending the patient. While not sophisticated, high proof vodka is an acceptable source of ethanol and can be given intravenously. Those hours between ingestion and starting therapy can spell the difference between success and failure. Once renal failure is established, there are few therapies that can save the patient.

**To refer directly to the VEC ICU call (416) 920-2002**